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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Heart Ease Clue

See Page 219

A SCIENCE SERVICE PUBLICATION

What General Electric people are saying . . .

W. H. ROBINSON, JR.

Mr. Robinson is Manager of Advertising, Lamp Division

". . . A 'hairpin in a bottle," the first incandescent lamp made practical by Edison in 1879, began a chain of circumstances that brought our country and our way of life out of one world and into another.

For the principal difference between the America of today and that of 75 years ago is electricity—the energy, and the appliances and equipment that help the factory worker, the farmer, the homemaker—that relieve us of drudgery and make each hour of working time far more productive.

When Edison turned his inventive, but very practical, mind to the problem of electric light, he realized that it would not be enough merely to invent an efficient light source. The job, as Edison saw it, was to perfect a lamp with long burning life, that could be manufactured in large quantities and offered at low cost. Large numbers of these lamps would have to be supplied with electric current from a single source—yet it must be possible to turn lamps on and off individually.

Thus Edison had to solve not only the difficulties that had balked other inventors. He also had to devise a method for satisfactory supply of current, which would have to be manufactured and brought to each lamp, ready for use at the customer's wish.

In other words, Edison conceived and created, in miniature, the entire electrical industry as we know it today. He could buy very little. Generators, wiring, sockets, switches—all had to be invented, designed, and manufactured.

The "hairpin in a bottle" that burned for 40 hours in Edison's laboratory in 1879 was far more than a better light than the world had yet known. It was also the starting point for the electric utility industry, the electrical manufacturing and the electrical construction industries, that make it possible for electricity to serve us today.

at The Electric League, Chattanooga, Tenn.

R. M. SWETLAND

Mr. Swetland is Manager, Illuminating Engineering Laboratory, Lighting and Rectifier Department

". . . Approximately 40,000 traffic fatalities have occurred on American roadways during 1953! About 60% of these—roughly 24,000—occurred at night. Experience, over many years, proves that fully one half of these night fatalities—some 12,000 lives—could have been saved by adequate roadway lighting—protective visibility.

The National Safety Council estimates the total economic loss, per traffic fatality, as $95,000. Thus 12,000 fatalities represent over 1.1 billions of dollars in such losses.

The American public now spends approximately $1.25 annually per capita for street lighting. It is reliably estimated that the doubling of this investment in protective street lighting (another $200,000,000) would *eliminate* this 1.1 billion in economic loss; that is, each $1 additional investment in roadway lighting saves over $5 in economic loss—plus its share in saving some 12,000 American lives.

Higher illumination levels will be needed to adequately protect future traffic flow—both vehicular and pedestrian. Luminaires giving increased light output, properly controlled, are being planned to meet these demands.

Systematically planned street lighting improvement programs pay attractive dividends in (a) merited illumination and protection for each type of roadway, (b) standardization of equipment, and (c) a maximum of protective visibility per $1 of investment.

A recent reliable poll of experienced street lighting engineers reveals that *only* about 7% of our lighted streets and highways now meet A.S.A. recommended illumination levels.

Thus, we're a long way from the street lighting saturation point.

at Yale University

G. S. BENNETT

Mr. Bennett is in the Electro-Mechanical Engineering Services Department, General Engineering Laboratory

". . . It has long been felt by many people, mostly those not in industry, that industrial ultrasonic applications would never be economical. This viewpoint was well put by W. T. Richards, writing in the Journal of Applied Physics for May, 1938.—"In fact, about 1932 there was a feeling in the air that anyone who manufactured anything, with the possible exception of horn buttons, was either installing a supersonic outfit or wishing he had the money for one. The chief beneficiaries of this movement were the electric power companies.—But the electrical production of sound waves is appallingly wasteful—they will be supplanted by more efficient mechanical devices.' Now the fallacy in this viewpoint is the confusion of the words "expensive" and "uneconomical." These are not synonymous—a very strong case can be made for the argument that the highest priced automobile is actually the most economical in the long run. In the same sense, an industrial ultrasonic installation is still expensive, but if a necessary operation can be performed which cannot be done in any other way, if a product can be improved, if time or space can be saved, the initially expensive installation can result in long-range economy. It is in this light that any industrial process must be considered, and in which ultrasonic is gaining acceptance.

at Michigan State College.

You can put your confidence in—

GENERAL ELECTRIC

MEDICINE

Cancer Conquest Search

Cancer, the nation's number two killer, is being attacked by a vast multi-pronged army of scientists in hospitals, clinics and research laboratories.

Cancer is a big, almost daily story, and will be until—and if—science conquers this number two human killer. SCIENCE SERVICE *is represented on the coast-to-coast visit being made to leading cancer research laboratories conducted by the American Cancer Society by C. Marden Cotton. The following stories are from the first leg of his trip.*

▶ BREAST CANCER in highly susceptible mice can be halved by giving the female a rest period between pregnancies.

Dr. Katherine P. Hummel of the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me., found that one strain of mice, bred very rapidly, had a 14% incidence of breast cancer, while the incidence dropped to seven percent with a rest period between pregnancies.

No similar results for breast cancer in humans have been reported, although Dr. Hummel indicated that studies are now in progress elsewhere to determine if there is a high incidence of such cancers in women who have had children rapidly.

The frequency of these cancers in mice is dependent upon hereditary susceptibility, hormone balance, the presence of a virus agent in the mother's milk and other factors, yet unknown.

If the virus-like factor is added to the slow-bred mice, the incidence of breast cancer is higher than normal, but still less than for fast-bred mice with the factor.

Dr. Hummel traced the higher incidence to the constant hormone stimulation in the fast-bred animals.

Another study at this laboratory has shown that ovaries taken from two-year-old mice, equivalent to 75 human years, can be transplanted to young females and in their new environment, they become active and offspring are produced. Dr. Leroy Stevens, who made this discovery, found that such transplanted old ovaries frequently developed tumors seven to nine months after the transplantation.

Sets Leukemia Record

▶ LEUKEMIA, A dread cancer of the blood which is always fatal, has been checked in a seven-year-old boy for 57 months at Children's Hospital, Boston.

Dr. Sidney Farber of the Harvard Medical School described the boy as healthy in every other respect. The length of time the blood cancer has been held in check is the longest ever reported.

Ordinarily, leukemia kills its victims in a matter of a few months. The boy has been treated with chemicals that hinder the production of folic acids. Dr. Farber said the extraordinary period during which the disease has been checked is due to the fact that the boy's body has not yet developed a resistance to the anti-folic compounds.

Dr. Farber compared the treatment with the more familiar treatment of diabetes with insulin. He emphasized that the boy still has leukemia. This treatment is in no sense a cure and when the compounds are stopped, the effects of the disease are noticeable within a few days, as when diabetics fail to take insulin.

While he is under this treatment the boy does not stay at the hospital, but remains at home where his life resembles that of any other normal boy.

Radioactive Arsenic

▶ A SHY little girl, eight years old, has been saved from possible permanent brain injury or death due to a brain tumor by the combined skills of a surgeon and a physicist.

Holly Jane Hyde, daughter of Mr. and Mrs. R. Colin Hyde, Smithfield, R. I., was operated on a year ago. Dr. William H. Sweet, assistant professor of neurosurgery, Harvard Medical School, Boston, described her as cured.

The apparatus used to locate the tumor accurately was designed by Dr. Gordon Brownell, research associate in physics, Massachusetts Institute of Technology, in collaboration with Dr. Sweet.

A small amount of radioactive arsenic was injected into Holly's veins, and two hours later her head was placed between two counters that recorded the positrons emitted by the arsenic carried to the brain. A second scanning was given a day later.

Brain tumors take up anywhere from three to ten times as much arsenic as normal brain tissues. Areas of heavy radiation emission clearly mark the location and size of the tumor for the operating surgeon.

Scintillation counters are mounted on a carriage that sweeps backward and forward automatically beside the head, dropping about a third of an inch at each sweep. In this manner a complete map of the brain tumor is made. The tumors stand out on the radiation map like mountains on a flat landscape.

Holly's first symptoms were recurring attacks of blank staring or completely irrational behavior. Four months after the first attack, the tumor was located and removed. Other diagnostic methods tried gave no positive trace of the tumor.

CEREMONIAL MASK—One of the examples of African art and sculpture now on view in Yale University's new art gallery, this African ceremonial mask is from the Belgian Congo. The exhibition is a memorial to Prof. Ralph Linton, noted anthropologist who died last December, and is one of the many masks, as well as statues and figurines, included in the first public showing from his extensive collection.

Since her operation, Holly has had no attacks and has advanced rapidly in reading ability. The tumor was located in the left temporal area of the brain—between the eye and the ear.

Dr. Sweet said that the radiation method has been successful in about 80% of the nearly 300 cases on which it has been tried. An added advantage of the method is the complete lack of risk. Other detection methods frequently involve surgery and possible death.

Similar attempts with this manner of locating tumors in the brain have been tried elsewhere without success, Drs. Sweet and Brownell said. Those attempts did not use the radioactive arsenic.

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TECHNOLOGY

Colored X-Rays Provide "New Look" for Medicine

▶ COLORED X-RAYS are giving anatomy and roentgenography classes at the University of California at Los Angeles a "new look."

Dr. Louis J. Bonann, Los Angeles radiologist formerly with the Medical School, developed the color X-ray process. It involves Kodak Matrix film and results in a transparency that can be dyed directly after the film is developed.

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PSYCHIATRY

Intense Hostile Dreams

▶ PEOPLE WITH high blood pressure feel more intense hostility in their subconscious, or dream, life than people with normal blood pressures, psychiatrists at the University of Pennsylvania find.

The psychiatrists have worked out a "hostility scale" for measuring the intensity of hostile feelings as shown in dreams.

At the top of this scale is any dream element that represents the actual or threatened death of persons. This rates six.

Destruction of objects in a dream rates five. Five and six make up the highest category on the hostility dream scale.

In the medium category are any dream elements that represent actual or threatened injury or damage to persons, rating four, and to objects, rating three.

In the category of least hostility are elements that mean discomfort or minor impairment. If this is to persons it rates as two, if to objects, it rates as one.

The scale was tested on 78 dreams from 33 persons, 17 of whom were chronic high blood pressure patients from the hypertensive clinic of the Hospital of the University of Pennsylvania. These were collected by interviews with experienced social workers. The other 16 dreams were from summer school college students with normal blood pressure. They wrote out their own dreams on a standard questionnaire form.

Each person provided at least two dreams of at least 30 words. The average length of the dreams was 65 words, and the high blood pressure patients and college students had dreams of about the same length.

Hostility is significant in other illness than high blood pressure, the psychiatrists point out. They feel their "pilot study" of the hostility dream scale is encouraging and may, with further refinement, give a method for quantitative study of emotional forces.

They also see coming from it better understanding of essential hypertension and other psychosomatic illnesses, with possible applications to diagnosis, treatment and prevention.

Psychiatrists who made the study are Drs. Leon Saul, Edith Sheppard, Dorothy Selby, William Lhamon, David Sachs and Regina Master. They report their findings in *Science* (March 19).

Science News Letter, April 3, 1954

PHYSICS

Cooling Atomic Rockets

▶ FUTURE EXPERIMENTS on a cooling system said to be "particularly feasible when nuclear energy is used as the power source for rockets and jet engines" were outlined to scientists administrating aeronautical research under "Project Squid."

Although applications of the cooling system to atom-powered planes and missiles is still largely speculative, studies on the system already are being conducted by a research team under guidance of Dr. Shao Wen Yuan, associate professor of aeronautical engineering at the Polytechnic Institute of Brooklyn, and continued research was proposed.

The cooling system more immediately might be applied to combating the high heats generated on the wings of supersonic planes due to air friction.

The current and proposed experiments form a part of a program of basic research aimed at turning up more knowledge about jet and rocket engines. Project Squid is sponsored by the Army, Navy and Air Force. It is being administered by Princeton University under a contract with the Office of Naval Research. Subcontracts currently are held by 10 universities, three corporate research laboratories and one government agency.

At an annual gathering of Project Squid scientists in Princeton, N. J., Dr. Yuan said that current rocket and jet engine materials will not be able to withstand the terrific heats that will be generated by better fuels in the future.

Thus, he said, scientists must develop materials that can withstand these heats, or they must learn to keep existing materials cool while the blaze swirls within the combustion chamber.

Dr. Yuan said that a cool gas or liquid can be forced through the walls of combustion chambers made of a porous metal. The coolant absorbs heat from the metal and carries it back to the combustion chamber. It also forms a thin layer around the chamber surface to help keep the metal cool.

Some of the other groups presenting progress reports said that they hope to continue experiments which will help engineers fight "blowouts" in jet engines. When the flame of a jet engine blows out, a pilot can get into serious trouble unless he can relight his engine or find a nearby airport where he can land his craft "deadstick."

Other research conducted under Project Squid auspices includes studies of the heat-conducting and viscous properties of fuels, mixing of subsonic and supersonic gases, vaporization of fuels, chemical reactions in combustion processes, ignition and flame stability, ions in flames, and flames fed by oxidizers other than pure oxygen.

Past research of Project Squid has led to the development of new and better engines now cloaked in security. It is said that German engineers who developed the V-1 and V-2 rocket would scarcely recognize the current models of these engines.

It is also speculated that some of these new engines will make the dream one-man helicopter come true.

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The Atomic Energy Commission is investigating the possibility of building a small *nuclear power plant* as the prototype of a package power plant for military use.

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PSYCHIATRY

Drug Quiets Mentally Ill

➤ MENTAL PATIENTS in the severely excited, or manic, phase of their illness can be quickly quieted and sometimes improved enough to leave the hospital by a new drug, Chlorpromazine, Drs. H. E. Lehmann and G. E. Hanrahan of Verdun Protestant Hospital, Montreal, Canada, report to the American Medical Association's *Archives of Neurology and Psychiatry*.

The drug was first announced as effective for stopping nausea and vomiting. (See SNL, Sept. 26, 1953, p. 200.) At that time sedation, or a quieting action, was reported as a side effect. Other side effects were also noted then.

The drug was used for its quieting effect on 71 psychiatric patients aged 18 to 82 years over a period of four months. The Montreal doctors report that it arrested imminent psychotic attacks in four patients, effected recovery and sustained cessation of symptoms in 13 patients, reduced symptoms to the point where patients were able to leave the hospital in seven cases, lessened the symptoms of 27 patients, and failed to cause any improvement in 12 patients. Eight of the patients receiving the drug were still under treatment at the time the report was made.

"The drug is of unique value in the symptomatic control of almost any kind of severe excitement," the doctors pointed out. "It has pronounced effect on the central nervous system.

"We are particularly impressed with the favorable results in our manic-depressive patients in a chronic manic state, all of whom had been continuously manic or hypomanic for more than a year and had previously failed to respond to standard therapeutic procedures or had had only brief remissions.

"Psychomotor excitement is usually reduced significantly within 24 hours, and sleep at night is often restored within the same period. Feeding problems disappear rapidly, and the patient soon becomes cooperative to nursing care. The psychiatrist is surprised to find his manic patient amenable to reason.

"In acute manic states, Chlorpromazine therapy usually leads to recovery in a shorter time than is required with other, established treatment procedures."

The drug should not, the doctors warned, be expected to act as a cure-all in mental sickness. If the factors in the environment and the conflicts that have caused the sickness cannot be removed or worked out, the drug can only be considered an aid to psychiatric treatment.

Chlorpromazine is made by Smith, Kline and French Laboratories, Philadelphia.

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ANTHROPOLOGY

Two Great Migrations

➤ TWO GREAT migrations, one of men and their new ideas and the other of ideas alone, were responsible in large part for the cultural development of the native people of eastern and midwestern United States, Dr. Albert C. Spaulding of the University of Michigan told an Anthropological Society of Washington meeting.

The original inhabitants of America had pretty much the same customs and ways of life throughout the land. They lived by hunting and gathering the wild foods of the forest and had little social development. Remains of their bones show that they were a small people, slight and lithe.

However, around the year 1,000 B.C., a new people appeared. They were broad headed, taller and more rugged than the earlier people. They brought with them the revolutionary idea of growing food and introduced a new food, corn. With the leisure provided by agriculture they advanced technological development. They made pottery. And they developed a complex social structure as shown by their burial mounds and the elaborate ritual with which they cared for their dead.

This culture is known to scientists as the Adena culture and it spread over southern Ohio, northern Kentucky, Indiana, West Virginia and Pennsylvania. Evidence points to the fact that this new people with their new cultural influences came from Mexico.

Another spectacular development occurred about 2,000 years later in the same area. However, this time it was the result of the importation of ideas, not men. The ideas, in this case, too, came from Mexico or through Mexico from farther south.

The people of this new culture, called the Hopewell culture, had a much more intensive agriculture than their predecessors. They built spectacular flat-topped pyramids very like those found in Mexico. They lived in what might almost be called cities, certainly large villages or ceremonial centers. They made a new style pottery of clam shells with a glazed finish that was sometimes ornamented by modeling.

Evidence left behind them showed that these people traveled great distances. They had obsidian from the Rocky Mountains, an alligator jaw from Florida and mica from the Appalachian Mountains. They may have found their way to Mexico and there may have become indoctrinated with new ideas and ways of life. In spite of the architectural styles, art elements and technological elements of Mexican origin, nothing has ever been unearthed in the region of the Hopewell people that was apparently of Mexican manufacture.

This indicates, Dr. Spaulding explained, that it was the ideas that were imported, not Mexican wares or Mexican people.

The dates of these two great cultural developments have been derived from radiocarbon dates on some of the remains left by the peoples.

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GENERAL SCIENCE

Revise Tasks to Save Existing Manpower

➤ INDUSTRY HAS been advised to revise employees' jobs "downward" so that semi-professional and technically trained persons assume some of the load now carried by professional men and women who actually should be using their special skills exclusively.

This was one of six recommendations made by the National Manpower Council in the interest of better utilization of America's manpower. The recommendations are an outgrowth of a conference held last fall in which 66 national leaders in scientific, industrial and military fields participated. (See p. 220.)

The Council also recommended: a greater investment in physical and financial resources to permit the highest possible use of manpower skills; greater and more effective incentives to cut down employee turnover; development of new work patterns; a revision of personnel training to avoid wastes, and improved leadership and administration.

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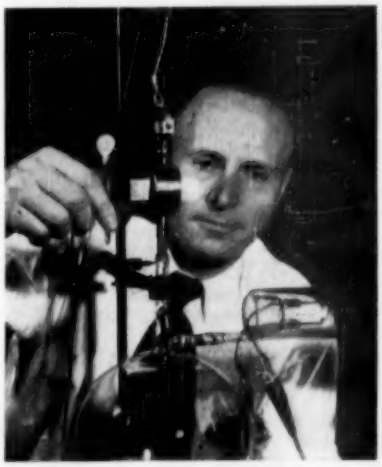

HIGH VACUUM PUMP—Dr. Anatole M. Gurewitsch adjusts a powerful magnet around a vacuum system using the new "ionic pump" developed by him and Dr. W. F. Westendorp of the General Electric Research Laboratory, Schenectady, N. Y. (See SNL, March 27, p. 200.)

GENERAL SCIENCE

Earmarking the Talented

Dr. Lewis M. Terman, known for his testing and follow-up studies of geniuses, urges an early spotting of exceptionally talented children, followed by speeded-up schooling.

➤ THE EXCEPTIONALLY talented child should be spotted early and allowed to speed through grade school and high school in order to enter college by 16 or 17 at the latest.

Dr. Lewis M. Terman, emeritus professor of psychology, Stanford University, urged such a program when he delivered the Walter VanDyke Bingham memorial lecture at the University of California, Berkeley. Dr. Terman is known for his testing of geniuses among school children, and for follow-up studies to find out how these talented youngsters turned out.

He pointed out that studies of the age at which the best creative work is done have shown that, in nearly all fields of science, the best work is done between the ages of 25 and 35.

"Youth of high achievement potential should be well trained for his life work before too many of his most creative years have been passed," Dr. Terman said. Parents need have no fear that their bright sons and daughters will "burn out" early and become dull adults or "peculiar" people who find it hard to get along with their associates.

Of the gifted group studied by Dr. Terman, 29% graduated from high school before the age of 16 and a half. In follow-up studies, he compared the speeded-up ones with those who were kept back among their less gifted schoolmates.

Health records were equally good, he found. More of those who had been speeded along graduated from college, and, on the average, they received degrees nearly a year and a half earlier. They married nearly a year earlier, had a lower divorce rate and score just a little higher on a test of marital happiness, his study showed.

On the other hand, the exceptionally bright student kept with his age group finds little to challenge his intelligence, and all too often develops habits of laziness that later wreck his college career, Dr. Terman warned.

Tests that permit the identification of gifted children are available in great variety and at nearly all age levels, from the primary grades to graduate school. If the boy or girl who is potentially a great scientist is not identified before he reaches the graduating class in high school, there is a very good chance of his being found there by the Science Talent Search, Dr. Terman said. Since this talent hunt, conducted by SCIENCE SERVICE, was inaugurated in 1942, nearly 4,000 boys and girls have been picked for honors out of many thousands who have competed.

"As our need for more and better scientists is real and urgent," he said, "one can rejoice at what the talent search and the science clubs are accomplishing. One may regret, however, that the spirit of the times is not equally favorable to the discovery and encouragement of potential poets, prose writers, artists, statesmen and social leaders."

Also important in developing creative scientists is the atmosphere in which they pursue their college studies, Dr. Terman explained. A study of 18,000 scientists listed in American Men of Science, who earned their bachelor's degree between 1924 and 1934, showed that it is not the great university but the small liberal arts college that has the best record of turning out scientists.

Reed College in Portland, Ore., topped the list with 132 scientists per thousand graduates. The only technological school in the top 12 was the California Institute of Technology, which was second with an index of 70. Kalamazoo College was third with 66; Earlham, Richmond, Ind., fourth with 57, and Oberlin, Ohio, fifth with 56. Only a half dozen of the great universities were in the top 50.

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• RADIO

Saturday, April 10, 1954, 3:15-3:30 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS Station.

Prof. Charles F. Bonilla, professor of chemical engineering, Columbia University, will discuss "Nuclear Engineering."

TECHNOLOGY

Glass Bonded to Plastic, New Bodies for Airplanes

➤ AIRPLANE BODIES, boats and automobiles in the near future may be made of glass and plastic chemically bonded together, experts from the U. S. Naval Ordnance Laboratory, White Oak, Md., predicted at the American Chemical Society meeting in Kansas City, Mo.

Five new bonding compounds, all belonging to the class known as chlorosilanes, have been developed to combine with the different types of plastics. Drs. Porter W. Erickson, H. A. Perry Jr. and Irving Silver reported. Part of each of the new compounds will unite chemically with one of the plastic materials while another part will join the structure of glass.

Chemical bonding joins the plastic and glass more solidly than the usual glues and cements. The bonded materials can be made into laminated panels that hold together through repeated test foldings, showing that the finished material combines plastic's flexibility with the strength of the glass fibers.

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BIOCHEMISTRY

Clue to Radiation Cure

➤ A CURE for atomic radiation sickness is in the works. Whether it will be ready in time to help any future victims of accidental radiation exposure, such as those from the March 1 H-bomb tests, or of intentional military use of nuclear weapons cannot be told at present.

So far, however, scientists have found a way to cure radiation sickness in mice. And they have insight into a fundamental mechanism of body chemistry which must be acted on by medicines designed to save radiation victims.

This much appears from a report by Dr. R. K. Main, chief radiological chemist in the U. S. Naval Radiological Defense Laboratory, San Francisco, to the American Chemical Society meeting in Kansas City, Mo.

The mice were cured of their radiation sickness by a "spleen protective factor" obtained from the spleens of young mice. Discovery of this factor was made at the University of Chicago.

How the spleen factor works, which should help toward making a radiation sickness medical cure, was discovered with the aid of radioactive carbon-14. This was used as a tag for a formate chemical. The tagged formate was injected into the mice which were then exposed to X-rays. These studies showed that the tissues of the irradiated mice could not make purines. Purines are chemicals important for building nucleic acids. These acids, in the nucleus of each cell, are intimately associated with cell division and growth.

When the irradiated mice were injected with spleen protective factor, the carbon-14 studies showed that seven days later the mouse body cells were again able to make purines.

From this lead may come the building of chemicals that can save humans as the material from young mice spleens saves other mice exposed to killing radiations.

Associates of Dr. Main in the study were L. J. Cole and Dr. V. P. Bond.

Science News Letter, April 3, 1954

Farmer *cooperatives* in the United States now have a membership of 7,400,000, an increase of four percent in the last year and a record high.

LAUNCHING POSITION—This is how the U. S. Air Force's B-61 Martin Matador, powered by a turbojet engine, looks when ready for launching. The first squadron equipped with the pilotless bombers is now in West Germany after training at Cocoa, Fla. It is the first overseas deployment of any unit using a pilotless, radar-controlled aerial weapon. The B-61 is platform-launched with the assistance of a rocket bottle that falls off when its thrust is expended.

NUTRITION

Milk for Heart Patients

➤ HEART PATIENTS in the Los Angeles area can now drink fresh fluid milk without getting more salt than their doctors think they should have.

The new milk is a low-sodium, or low salt, milk made by a process developed by Dr. A. L. Chaney, a chemist of Glendale, Calif., with the assistance of the Los Angeles County Heart Association.

It will be delivered to heart patients in their homes as well as to hospitals on a doctor's prescription. Patients in other parts of the country will be able to get it as soon as licensing arrangements now being made with major milk companies are completed.

Milk is an important food, but its high sodium content has banned it for patients whose doctors put them on a salt-free diet because of certain types of heart disease or high blood pressure. Until now, these patients had to rely on powdered milk products that had to be reconstituted with water to produce a fluid milk for drinking or pouring over breakfast cereals.

Dr. Chaney's process removes 90% of the original sodium content of ordinary milk, but does not otherwise change the milk. The final product is a fluid said to be indistinguishable in taste from ordinary milk. It costs about 40% less than most powdered low-sodium milks.

Dr. Edgar F. Mauer, president of the Los Angeles County Heart Association, described the new product as an "outstanding contribution to the treatment of heart failure through diet." He said about 10% of the menus of hospitals in Los Angeles County call for low-sodium meals, a ratio he termed typical of hospitals throughout the country. The new milk, he said, will also prove beneficial in low-sodium diets prescribed for patients suffering from illnesses other than heart or circulatory disease.

Three years of experimental work, undertaken by Dr. Chaney at the urging of Heart Association physician members, preceded the perfection of the new process on a test-tube scale. The Los Angeles County Heart Association was instrumental in arranging for its subsequent trial by a commercial dairy, and in winning approval from the California State Bureau of Dairy Service for large-scale production and distribution.

Science News Letter, April 3, 1954

Radio telescopes are rapidly becoming a standard astronomical instrument.

PHYSICS

"Layer Cake" Used To Track Cosmic Rays

➤ "LAYER CAKES" are now being used by physicists to pry into the secret life of an atom's heart. They give at least 100 times more information about the mysterious cosmic rays bombarding earth from space than could be obtained previously.

The "layer cake" is made up of paper-thin sheets of film emulsions, stripped from their backing, then "pasted" together into piles an inch or two thick. Sent high into our atmosphere by balloons, the piles of stripped emulsions record the tracks of cosmic ray particles hurtling at the earth with more than three times the energies yet obtained by man in his giant atom smashers.

By studying these tracks, physicists can learn about the forces within an atom's nucleus, which contains the energy of the universe. Using the layer cake method gives tracks up to 10 times longer than those previously available, and the longer the track, the more information it yields.

Drs. Maurice M. Shapiro, Bertram Stiller and Francis W. O'Dell of the Naval Research Laboratory in Washington will report on how to make and use the emulsion piles in the *Review of Scientific Instruments* (April).

They are now scanning emulsions recently exposed to cosmic ray bombardment at the equator, where the earth's magnetic field sorts out and bends away all cosmic rays except those with very high energies.

Since it takes about a month to scan a single emulsion not much thicker than four or five sheets of paper, no results are yet available. A quick preliminary survey, however, Dr. Shapiro said, looks "very promising."

Science News Letter, April 3, 1954

METEOROLOGY

Local Weather Forecasts Will Cover Three Days

➤ BETTER LOCAL weather forecasts covering a three-day period in advance were available at the breakfast hour in most communities across the country starting April 1, according to the U. S. Weather Bureau.

Previously, such forecasts were issued in the late forenoon to cover only the following 48 hours. Farmers are particularly interested in the forecast for the third day because cutting, drying and storing hay generally takes three days, during which the ideal forecast is "no rain."

Hay is the third largest agricultural crop in the U. S., following corn and wheat. Farmers want the weather prediction early in the morning, while they make plans at breakfast for the day's work. The Weather Bureau plans using early morning radio programs to bring the local forecasts to each community. Dr. James Beall is coordinating the new nation-wide program.

Science News Letter, April 3, 1954

PSYCHOLOGY

Link Moral Indignation To Suppressed Anger

▶ HOW DO you feel when a communist makes a speech to you about his beliefs? Does it make "your blood boil?" Are you angered by the person who avoids the draft because of "nervous" illness? Are you shocked by the way Hollywood stars change husbands or wives almost over night?

Such moral indignation is related to the way your parents treated you as a small child, Dr. Sidney M. Jourard of Emory University, Ga., reports in the *Journal of Consulting Psychology* (Feb.).

Parents almost inevitably rouse hostility in their children by their efforts to train them and turn them into socialized citizens, he explains. Some parents then allow the furious little boy, or girl, to shout his resentment and even to stamp a small foot and scream "I hate you!" Other parents clamp down firmly on any such outburst. In the latter case, the children may grow up into adults who never express dislike or disapproval of any traits of the parents.

In fact, no matter what the father or mother does, the son or daughter will tend to see him in "undifferentiated, uncritical almost magical terms," Dr. Jourard has observed.

Of 115 persons tested by Dr. Jourard, it was found that those who admit little criticism or dislike of parents are those who express the most violent "moral indignation" about communists, public figures with "loose morals," or individuals who shirk civic responsibilities or otherwise offend against the social mores.

Science News Letter, April 3, 1954

TECHNOLOGY

Machine Analyzes Sound As Aid to Mechanics

▶ A MACHINE has been developed that singers could use to analyze the pitch, tone, timbre, resonance, intensity, volume and range of their voices.

Unlike the music teacher who encourages his pupils with a bit of "white flattery" here and there, the machine renders an unemotional opinion of what it hears. If the singing is punk, the machine says so. And it say so with bits of information that pour in at the rate of 84,000 a second.

Although musicians could use the device for self-criticism, Raytheon Manufacturing Company engineers had the industrial man, the mechanic and the technical troubleshooter in mind when in Waltham, Mass., they created their "electronic ear."

The sound analyzer can dissect a mysterious throb in a car for a garage mechanic. It could tell whether the unnatural noise was due to loose bearings or an unbalanced crankshaft.

The engineers report their machine has a battery of "parallel elements" that permit it to examine an entire spectrum of sound frequencies at once. It takes these sounds apart for study and presents its findings as 84,000 bits of information a second.

In a split second it can analyze the crash made by a hammer blow, or an annoying squeak in machinery. It can provide scientific evidence that a violin is a Stradivarius, not a cheap fiddle.

The machine recently was displayed at the Institute of Radio Engineers meeting in New York.

Science News Letter, April 3, 1954

GENERAL SCIENCE

FTC Cracks Down On Battery Additive

▶ THE FEDERAL Trade Commission has cracked down on the battery additive, AD-X2, charging that advertising claims made for it are "false, deceptive and misleading."

Dispute over the alleged merits of this battery additive touched off a violent controversy resulting last year in the firing and subsequent reinstatement of Dr. Allen V. Astin as director of the National Bureau of Standards. The Bureau's work in storage battery testing was upheld by a special committee of the National Academy of Sciences when it found the battery additive AD-X2 to be "without merit." (See SNL, Nov. 28, p. 339.)

The Federal Trade Commission, in issuing the complaint, pointed out that the "controversial claims for the product" could be resolved at public hearings, now scheduled to be held in Washington on May 10.

The battery additive AD-X2 contains mainly magnesium and sodium sulfates, chemicals that have been tested for over 30 years at the Bureau and found ineffective in pepping up batteries. The Academy committee reported that there was "nothing mysterious or remarkable in the behavior of either AD-X2 or sodium or magnesium sulfates. In all cases the effects observed corresponded to well-known laws of physical chemistry."

Science News Letter, April 3, 1954

CHEMISTRY

Hydrogen Peroxide Destroyer of Draperies

▶ A STRANGE reaction between sunlight and certain yellow dyes has been blamed for causing some cotton or rayon draperies to come back tattered from cleaning.

The National Institute of Drycleaning, Silver Spring, Md., reports that certain yellow dyes, when exposed to sunlight and moisture usually present in drapery fabrics, speed the formation of hydrogen peroxide, the chemical that is famous for making blondes out of brunettes.

The hydrogen peroxide attacks the fabric to weaken it. At the end of merely one summer, the material may be so weakened that ordinary handling for dry cleaning will cause the drapes to rip and tear where the yellow part of the pattern was printed.

Science News Letter, April 3, 1954

IN SCIEN

ENTOMOLOGY

June Bug Larvae Damage Young Pine

▶ WHITE GRUBS, the larvae of June bugs, cause the losses in pine seedlings that were previously blamed on dry weather.

This discovery, the Atomic Energy Commission reports, is expected to "benefit all growers of pine" in the South. Now that the grub menace has been brought to light, forest experts can cope with the losses the larval form of June bugs is causing, John Hatcher, U. S. forester at the AEC's Savannah River H-bomb plant, Aiken, S. C., said.

A total of 10,000,000 young pine trees were planted on about 10,000 acres of unused land at the project during the winter of 1952-53. By last fall, the seedlings on over 8,000 of these acres had been severely damaged by the white grubs.

Forest experts must now determine, Mr. Hatcher and entomologist J. G. Watts urge, "whether a sudden change has occurred in the feeding habits of the grub, or whether the problem has existed previously but has escaped detection."

Science News Letter, April 3, 1954

ENGINEERING

Liquid Gas to Kill Odor From Bus Exhaust

▶ TRANSIT OFFICIALS in three cities have handed "walking papers" to smelly exhausts from their buses.

Officials of transit companies in Chicago, Wichita and San Antonio reported to the Society of Automotive Engineers meeting in New York that liquefied petroleum gas, such as propane, burns to an odorless, smokeless exhaust, yields quiet bus operation and cuts costs.

However, a report from Harrisburg, Pa., revealed that costs of liquid petroleum gas, or LPG, which is an oil well and refinery by-product, were too high there to prove economical.

Furthermore, the Harrisburg company had to pay almost as much for LPG buses as they would have to pay for ordinary diesels. The Chicago Transit Authority, on the other hand, bought 500 LPG buses at $3,000 less per bus than it would have had to pay for diesels.

Where LPG fuel prices are substantially lower than diesel fuel or gasoline, the advantage of bus operation on such gases increases. Other than operators' salaries, fuel costs are the major expenses of a transit company. Other economic and technical details of LPG operation are reported in the *Journal of the Society of Automotive Engineers* (March).

Science News Letter, April 3, 1954

CE FIELDS

MEDICINE

ACTH Works When Snuffed Up Nose

► ACTH, PITUITARY gland hormone famous for the relief it brings in arthritis and numerous other ailments, is effective when snuffed up the nose, tests at the Civic Hospital, Ottawa, Ont., have shown.

Heretofore, ACTH has had to be given by hypodermic injections. It was not effective when given by mouth or by aerosol spray. In the recent tests, a highly purified ACTH in powdered form was used.

Dr. J. B. R. McKendry of Ottawa, Dr. Herbert Schwarz, now at McGill University, Montreal, and Dr. Murray Hall, now of Sunnybrook Hospital, Toronto, report in *The Canadian Medical Association Journal* (March).

The ACTH powder has now been given to more than 60 patients. All but three of the first 17 so treated were benefited by it. Their ailments included gouty arthritis, rheumatoid arthritis, bronchial asthma and allergic rhinitis.

One of the rhinitis-hay fever patients had suffered for eight years without getting relief from antihistamines or desensitization treatments. On the first day of treatment with the ACTH snuffed up the nose, her head and nose felt better and she said she could taste her food for the first time in six years. On the second day, she could breathe perfectly well, her head felt clearer than it had for years, and she was not affected by a visit to the country which usually made her feel much worse.

She is now snuffing ACTH powder every three or four days and remains free of symptoms.

Science News Letter, April 3, 1954

AGRICULTURE

Farmers Must Use Modern Practices

► FARMERS MUST learn to use the methods developed by years of agricultural research or they will go broke, in the opinion of informed observers.

A recent survey of Michigan farms showed that costs of producing five crops could be reduced significantly by adopting the practices recommended by state and federal agencies.

Improved farm practices cut the farmer's cost of producing a bushel of wheat from $1.65 to $1.28, of oats from 90 cents to 69 cents, and of corn from $1.21 to $1.02, U. S. Department of Agriculture and Michigan Agricultural Experiment Station experts found.

Recommended practices lowered the costs of producing a ton of alfalfa-brome grass hay from $16.80 to $13.30, and a ton of sugar beets from $11.21 to $8.19.

Increasing numbers of farmers are learning and using the practices developed in experiment stations across the nation. Department of Agriculture spokesmen wryly point out that the economic pinch is persuading many farmers to use methods they formerly spurned.

Biggest single cost-cutting factor found on the Michigan farms was using recommended rates of fertilizer. Timely planting, adapted crop varieties, seed treatment, crop rotation, soil management, tillage and weed control also helped reduce costs.

With all five of the crops studied, production costs were lowest when all recommended fertilization and cultural practices were followed.

A preliminary report on fertilizer consumption for the fiscal year 1953 supports the Department's contention of better farming. An all time high of 23,000,000 tons of commercial fertilizer was used by farmers that year, 700,000 tons greater than the previous year.

Science News Letter, April 3, 1954

BIOPHYSICS

Find Oxygen Gives Radiation Protection

► DISCOVERY THAT oxygen can protect against ionizing radiation, such as that from A-bombs, H-bombs and X-rays, is announced by Drs. C. S. Bachofer and M. Aelred Pottinger of the University of Notre Dame, Ind.

This is the first "clear-cut case" of oxygen protecting organisms against ionizing radiations, they state.

The organisms protected in their experiments were the tiny particles of bacteriophage T1, strain B. This phage acts specifically against the microorganism, *E. coli*, or the colon bacillus as it formerly was called.

Oxygen protected these phage particles against both X-rays and cobalt-60 gamma rays.

Heretofore oxygen has been reported most often as sensitizing organisms to radiation, making them more susceptible to radiation damage.

Whether the oxygen protecting effect is specific for this particular bacteriophage is a fundamental question still to be answered. Oxygen may have the same effect in organisms of more complex organization, such as higher animals and even man, but its effect may be obscured in the more complex organization, the Notre Dame scientists suggest.

The presence or absence of oxygen may change the phage particles in some way, thus changing their resistance to ionizing radiations. Or the protective effect may be due to suppression or enhancement of certain products of irradiated water. The phage particles were suspended in water when irradiated in the tests.

These problems are "under consideration," the scientists state in *Science* (March 19).

Science News Letter, April 3, 1954

BIOCHEMISTRY

Penicillin Unequaled Among Mold Remedies

► PENICILLIN, FIRST antibiotic or so-called mold remedy, "remains unequaled" as a drug despite years of intensive research for newer and better antibiotics, Sir Alexander Fleming, its discoverer, declared at the meeting of the American Academy of General Practice in Cleveland.

In the future, he predicted, antibiotics may be used more for hastening growth of livestock than for medical purposes. Air, milk, water, soil and hundreds of plants have yielded antibiotic materials.

Dr. Fleming discovered penicillin in 1928 when he was doing influenza research at St. Mary's Hospital in London. He noted a bacteria-free circle around unwanted mold and from it prepared a crude culture fluid, only one-millionth penicillin, then found it would still destroy bacteria when diluted 800 times. By comparison, there is more gold in sea water.

Ten years of additional research were required to produce concentrated, purified penicillin. Early attempts were defeated by the unstable nature of the product. In addition, Sir Alexander Fleming said, no one at that time appreciated the extraordinary potency of antibiotic preparations.

Finally, in 1940, scientists at Oxford University found that freeze-drying would preserve the unstable concentrate. Additional research and clinical investigation proved penicillin a complete success. Today, a single injection contains more pure penicillin than was contained in ten quarts of the crude culture fluid with which Dr. Fleming worked.

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BIOCHEMISTRY

Fat Breakdown Products Found Cancer-Forming

► BREAKDOWN PRODUCTS of fat dissolved in sesame oil cause experimental cancers in mice, Dr. Fritz Bischoff, Guillermo Lopez and J. J. Rupp of the Cottage Hospital Research Institute, Santa Barbara, Calif., reported to the meeting of the American Chemical Society in Kansas City, Mo.

Two factors, neither in itself cancer producing, may react together to stimulate abnormal growth, Dr. Bischoff believes.

Chemical breakdown of cholesterol, a substance found in fat, gives products closely related to the sex hormones. Yet neither the cholesterol nor the hormones, nor the sesame oil in which they are dissolved, gives rise to cancer when injected separately into experimental animals.

By varying both the breakdown products and the solutions in which they are administered, Dr. Bischoff and his associates have found that the combination of chemical and oily solvent is probably the key to production of the cancers they have induced in their laboratory animals.

Science News Letter, April 3, 1954

ASTRONOMY

Sun Eclipse Spectacle

Eclipse of the sun on Wednesday, June 30, will be visible as a partial dimming to millions of people in the U. S., Canada and Europe, weather permitting.

By ANN EWING

▶ PRACTICALLY EVERYONE in the United States east of the Rockies will be able to see a portion of the sun blotted out by the moon near sunrise on Wednesday, June 30. And those lucky enough to live in the narrow path of the total eclipse will view an awe-inspiring spectacle, one of the most magnificent of natural sights. Weather permitting, of course.

Sweeping out a huge arc as it touches the earth, the moon's deep shadow will race from Nebraska, where the total eclipse begins at sunrise, to India, where the eclipse ends at sunset. Zipping along at about 3,000 miles an hour, it will cover these thousands of miles in two and three-quarters hours. (Time difference between Nebraska and India is 11 and one-half hours, local time.)

In the U. S., the deep shadow swings over Nebraska, South Dakota, Iowa, Minnesota, Wisconsin and Michigan. The arc then proceeds over eastern Canada, Labrador, southern Greenland, Iceland, the Faeroes and Shetland Islands, southern Norway and Sweden, Russia, Iran, Afghanistan and Pakistan to its ending at sunset in northern India.

Will Be Widely Viewed

The June 30 event will be one of the most widely viewed eclipses of this century. Not until 2151 will there again be another total eclipse during which the path of totality spans both North America and Europe.

As a partial dimming of the sun's light, the eclipse will be visible over most of the land areas of the Northern Hemisphere, except for western North America and the eastern part of Asia. Although as far as is now known, there are no plans for live television shows of the total eclipse, at least two TV networks expect to show movies of the spectacle later in the day.

A total eclipse of the sun occurs when the moon comes between the earth and the sun, and the moon's shadow traces out a narrow path, never more than about 230 miles in width, on the earth's surface. Width of the June 30 eclipse path is less than 100 miles, and three and a half minutes is the longest it lasts at any one spot.

However, for thousands of miles on either side of this strip, a partial eclipse occurs, with part of the sun blotted out by the moon's lesser shadow, or penumbra. The nearer you are to the total eclipse path, the greater is the "bite" taken out of the sun by the moon.

For those in the eclipse path during the brief moments of the eclipse, many things in the sun's transparent atmosphere, normally invisible to the unaided eye, become strikingly visible. The corona, the giant pearly white halo of the sun, is spectacular.

The shape and structure of the solar corona during an eclipse varies, depending on whether sunspots are at a high or low point in the 11-year cycle. At sunspot minimum, which is occurring about now, there are long streamers shooting out from the equator, and short plumes or tufts from the polar regions.

Plans Made Long Ago

Plans mapped as long as two years ago will make the coming solar spectacle one of the most thoroughly observed in history. At least one astronomer from almost every observatory in the U. S. and Europe will be somewhere along the eclipse path. And astronomers here "presume" that Soviet scientists will be carrying out their own studies.

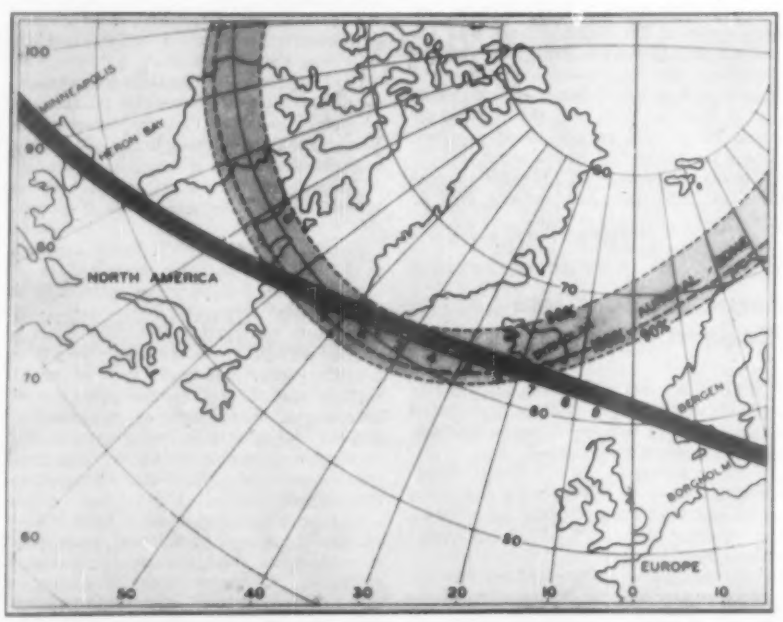
Two of the planned observations will be the first of their kind:

Scientists, flying in speedy Royal Air Force planes in the auroral zone where it is crossed by the eclipse path, will try to catch the first daytime glimpse of the northern lights. Being above the level of most clouds when the sun's bright light is suddenly shut off by the moon, they hope to confirm what is now only a suspicion: that the aurora is much brighter during the day than at night.

Check Shadow Band Speed

The shimmering curtains of the northern lights are thought to be caused by radiation and particles poured out by the sun, but sunlight is so brilliant that auroras have never been seen during the day, and have been spotted only infrequently at twilight.

For the California Academy of Sciences, Dr. Porter Butler and an associate will go to Sweden to check, with photoelectric equipment, the speed of the mysterious shadow bands. There are dark, ripple-like streaks that appear on every white surface



JUNE 30 ECLIPSE PATH—This map shows the path of totality for the June 30 eclipse and also the auroral zone, where the shimmering curtains of light are most frequently seen throughout the year. Where the two cross, scientists in airplanes will try to spot, for the first time, the northern lights during the day.

a few minutes before the moon's shadow engulfs an observer. Their cause is not known, and eye-witness descriptions are often conflicting. With two photoelectric eyes, set up 300 feet apart, the two scientists hope to get an accurate timing of the speed of these dark streaks and, perhaps, find out what causes the shadow bands.

The seemingly impossible task of searching for eclipse effects where the sun cannot be seen will be attempted by Drs. G. Van Biesbroeck, A. B. Meinel and Robert Weitbrecht of Yerkes Observatory, Williams Bay, Wis. Dr. F. E. Roach of the Naval Ordnance Test Station, Inyokern, Calif., is associated with the endeavor.

At a site along the path where the eclipse would be seen if the sun were above the horizon at that point, they will try to spot the faint zodiacal light. This observation must be attempted before the sun climbs into the sky, since even the relatively faint light of the corona, invisible except during an eclipse, is enough to block out the even fainter glow of the zodiacal light. The part of the zodiacal light that is visible as a faint beam in the west on a moonless night just after twilight is caused by sunlight reflected from meteoric material concentrated within the earth's orbit.

By looking at the horizon before the eclipsed sun rises, the three Yerkes astronomers hope to get the first good picture of the zodiacal light close to the sun.

Improve Distance Measurement

Other important observations to be made on June 30 will aim at giving a much more precise knowledge of actual distances between points in the United States and in Europe. Three different ways of finding long distances, especially across oceans, will be used. They are the Bonsdorff, Lindblad and Gaviola methods, named for the scientists who employed them for the first time. Each requires highly sensitive photographic and photoelectric equipment.

The Bonsdorff method directly photographs the crescents of the sun as the moon passes across it. The Lindblad method, also employing photography, shows the flash, or reversed spectrum, as the moon comes between the sun and the earth. The Gaviola method measures the decreasing light intensity as the moon shuts out the sun.

Because the speed of the moon's shadow is known and its position can be precisely timed, distances can be computed accurately using these three methods.

Four major and eight minor eclipse observation posts are involved in the mapping program, all under the direction of the Air Force Cambridge Research Center. Cooperating groups include the American Geographical Society, New York; Georgetown University, Washington, D. C.; Ohio State University, Columbus, and the Ernst Norrman Laboratories, Williams Bay, Wis.

Path of the next total eclipse visible in the United States, on Oct. 2, 1959, will start in Gardner, Mass., and cross the Atlantic Ocean to the Sahara Desert. On March 7, 1970, a three-minute eclipse will be visible along part of the East Coast.

Always protect your eyesight. Never look directly at the sun. Even when part of the sun is blotted out, you should use several layers of overexposed photographic film or a piece of smoked glass. Sun glasses, and even welder's goggles, are inadequate protection.

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BIOCHEMISTRY

No Alcohol Smell On Drunk's Breath

➤ WHAT YOU smell on a drunk's breath is not alcohol. It is "mainly the highly aromatic substances used in various alcoholic beverages," two Yale University scientists declare.

Aromatic or alcoholic, if the intoxicated person wants to cut the smell, he may get some help from "properly formulated chlorophyll products," but police who use chemical tests measuring the alcohol content of blood and breath will still be able to spot the inebriate.

The Yale scientists, Leon A. Greenberg and David Lester, report these findings in the *Quarterly Journal of Studies on Alcohol*.

Science News Letter, April 3, 1954

BIOCHEMISTRY

Toad Venom Material Aids Heart Ease Studies

See Front Cover

➤ THE PHOTOGRAPH on the cover of this week's SCIENCE NEWS LETTER shows a toad, *Bufo marinus*, with its venom gland exuding toxic material that contains a potent vasoconstrictor, serotonin, and cardiotonic steroids, related to digitalis.

Both of these classes of compounds are under biochemical investigation in laboratories of the National Heart Institute of the National Institutes of Health, Bethesda, Md.

This toad allows the biochemist to study the formation of substances ordinarily formed in minute quantities, in a living factory producing relatively huge amounts of the material for the size of the animal.

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GENERAL SCIENCE

Modern Medicine Creates Problems in South Africa

➤ A PRIME example of social problems created by medical advances is South Africa, Dr. Raymond B. Cowles, professor of zoology at the University of California at Los Angeles, reports.

"With vaccination and modern drugs checking such killers as smallpox, cholera and malaria, the population is increasing at a more rapid rate than ever," he pointed out on his return from a seven-month study of the country. "As a result malnutrition and prolonged diseases such as tuberculosis are becoming more widespread.

"A more equitable distribution of the land, much of which is held by the small white population, would not be a long range solution," he said.

"It might alleviate the situation temporarily, but the birth rate of the Negro and Indian populations and lowered death rate would bring the situation right back where it is today in a few years.

"Birth control," he noted, "is the obvious solution, but there are so many factors working against such a program that it seems out of the question."

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ANNUALS—Ann Roe Robbins—*Rinehart*, 95 p., illus., $1.50. The annuals include a wide variety of flowers of all colors and descriptions which you can raise from packets of seeds from the corner store.

AUTOMOBILE PARKING IN THE UNITED STATES: Selected References, 1946-1952—*National Academy of Sciences—National Research Council*, Highway Research Board Bibliography 14, publication 297, 119 p., paper, $1.35.

THE BCSO REVIEW OF SCIENCE IN U.S.A. FOR THE YEAR ENDING JUNE 1953—*Her Majesty's Stationery Office* (British Information Services), 44 p., illus., paper, 50 cents. The sixth of a series of annual reviews prepared by the British Commonwealth Scientific Office, but the second to be published.

BIBLIOGRAPHY OF NORTH AMERICAN MINOR NATURAL HISTORY SERIALS IN THE UNIVERSITY OF MICHIGAN LIBRARIES—Margaret Hanselman Underwood—*University of Michigan Press*, 197 p., paper, $1.75. Arranged by title and also by place of publication.

BUILDING UP THE SUPERVISOR'S JOB: With a Paper on Line Management's Responsibility for Human Relations—M. J. Dooher, Ed.—*American Management Association*, 35 p., paper, $1.25. Discussing what it will take to make the foreman a true part of management.

BUYING WOMEN'S COATS AND SUITS—Clarice L. Scott—*Govt. Printing Office*, USDA Home and Garden Bulletin No. 31, 23 p., illus., paper, 15 cents. What to look for and what to avoid so as to get your money's worth and becoming styles.

DIMENSIONAL METHODS AND THEIR APPLICATIONS—C. M. Focken with a foreword by H. Dingle—*Edward Arnold (St. Martin's)* 224 p., $6.00. Aimed at bringing about a larger measure of agreement in this controversial subject.

A DOCTOR TALKS TO WOMEN: What They Should Know About the Normal Functions and Common Disorders of the Female Organs—Samuel Raynor Meaker—*Simon and Schuster*, 231 p., illus., $3.95. Intended to aid the physician in answering the questions of, and making explanations to, his women patients.

EDUCATIONAL PSYCHOLOGY—Lee J. Cronbach—*Harcourt Brace*, 628 p., illus., $7.50. Attempting to bring psychological principles to teachers in such a way that they can perform their tasks more intelligently.

ESSAYS IN SCIENCE—Albert Einstein—*Philosophical Library*, abridged ed., 114 p., $2.75. An authorized English translation of the author's "Mein Weltbild" omitting his essays on Judaism, Germany, politics and pacifism and leaving only those devoted to science.

ESSENTIALS OF EFFECTIVE PERSONNEL ADMINISTRATION: Case Studies of Successful Company Experience—Paul Pigors and Charles A. Myers, panel chairmen—*American Management Association*, 51 p., paper, $1.25. An attempt to "take stock."

EUGENICS QUARTERLY: Volume 1, No. 1—Helen G. Hammons, Managing Editor—*American Eugenics Society*, 80 p., illus., paper, $3.00 per year. Replacing the Eugenical News as official organ of the Society.

EVERGREENS—L. L. Kumlien—*Rinehart*, 91 p., illus., $1.50. A book for home owners on the trees and shrubs that often decorate his yard.

FIRST YEAR COLLEGE PHYSICS—Clarence E. Bennett—*Ronald*, 526 p., illus., $6.00. Concentrating on the basic concepts and their relations without introducing too much mathematics.

A HISTORY OF THE THEORIES OF AETHER AND ELECTRICITY: The Modern Theories 1900-1926—Sir Edmund Whittaker—*Philosophical Library*, 319 p., $8.75. The purpose of this volume is to describe the revolution in physics which took place in the first quarter of the twentieth century, including the discoveries of relativity, quantum theory, matrix mechanics and wave mechanics.

LAWNS—John D. Bernard—*Rinehart*, 94 p., illus., $1.50. How to start a lawn, how to care for one that is established and how to repair it when the grass "doesn't even make the effort to grow."

THE MECHANISM OF INFLAMMATION: An International Symposium—G. Jasmin and A. Robert, Eds.—*Acta*, 308 p., illus., $8.84. Papers given at the first international symposium on this subject, presenting the views of contemporary authorities.

MOTIVATION: The Core of Management—Rensis Likert and others—*American Management Association*, 44 p., paper, $1.25. People, it is concluded, seek to achieve a sense of importance from doing difficult but important tasks that help to implement goals which they and their friends seek.

OPTICAL INSTRUMENTATION—George S. Monk and W. H. McCorkle, Eds.—*McGraw-Hill*, 262 p., illus., $3.75. This volume is one of a series prepared as a record of the research done under the Manhattan Project.

PROFESSIONAL NURSING: Trends and Relationships—Eugenia Kennedy Spalding—*Lippincott*, 5th ed., 636 p., illus., $5.00. To give the student nurse an awareness of professional problems and attitudes.

PROGRESS IN THE CHEMISTRY OF FATS AND OTHER LIPIDS: Volume 2—R. T. Holman, W. O. Lundberg and T. Malkin, Eds.—*Academic Press*, 347 p., illus., $9.80. Digests of recent advances contributed by specialists in the field.

ROSES—Roy E. Shepherd—*Rinehart*, 96 p., illus., $1.50. Telling how to grow that old and most satisfying favorite, and introducing the hobby of collecting old roses no longer on the "hit-of-the-week" list.

THE SCIENCE BOOK OF WONDER DRUGS—Donald G. Cooley—*Pocket Books*, 247 p., illus., paper, 35 cents. A medical reporter tells of the new drugs which, he says, have added ten years to our life expectancy since 1935.

SILICIFIED MIDDLE ORDOVICIAN TRILOBITES—H. B. Whittington and W. R. Evitt, II—*Geological Society of America*, 137 p., illus., $3.00. Sixteen species of trilobites, 15 of them new, are described. They are from the limestones of Virginia and the undistorted exoskeletons are preserved as a thin layer, or layers, of granular quartz.

SMALL FRUITS—Ralph E. Barker—*Rinehart*, 90 p., illus., $1.50. Devoted to all the berries and also grapes. Whatever the size of your place, you can make a place on it for berries, the author says.

THE SPONGES OF THE WEST-CENTRAL PACIFIC—M. W. de Laubenfels—*Oregon State College*, 320 p., XII plates, paper, $4.00. Based mainly on collections by the author; only shallow water sponges are included.

STEPPING UP OFFICE EFFICIENCY: Organization, Cost Control, Standards—J. McCall Hughes and others—*American Management Association*, 45 p., paper, $1.25.

THE STORY OF OUR TIME: Encyclopedia Year Book 1954—Marian Lockwood, Ed.—*Grolier Society*, 431 p., illus., $4.95. A review of the exciting events of the past year. The Science Highlights are contributed by Watson Davis, director of Science Service.

SYMPOSIUM ON DIESEL LOCOMOTIVE ENGINE MAINTENANCE: Including Spectrographic Analysis of Lubricating Oils, Filtering and Filtering Media, Cooling Water Treatment, Railroad Applications of the Electron Microscope—*American Locomotive Company*, 146 p., illus., paper, free upon request to Public Relations Department, Association of American Railroads, Transportation Building, Washington 6, D. C.

TABLES OF INTEGRAL TRANSFORMS: Volume I—Based in part on notes left by Harry Bateman and compiled by the Staff of the Bateman Manuscript Project—*McGraw-Hill*, 391 p., $7.50. The authors concentrated mostly on integrals involving higher transcendental functions, listing no double integrals.

THIRD ANNUAL REPORT ON STRESS—Hans Selye and Alexander Horava—*Acta*, 637 p., illus., $10.34. To serve as a guide to the entire literature on stress as it is published in different languages and in journals devoted to other specialties.

A THOUSAND GEESE—Peter Scott and James Fisher—*Houghton Mifflin*, 240 p., illus., $4.00. The story of what was literally a wild goose chase, the hunt for the breeding ground in the frozen north of the pinkfoot goose. Beautifully illustrated.

THE TRUE BOOK OF MOON, SUN, AND STARS—John Lewellen—*Childrens Press*, 46 p., illus., $2.00. Astronomy for the primer set illustrated by amusing drawings by Lois Fisher.

THE TRUE BOOK OF PEBBLES AND SHELLS—Illa Podendorf—*Childrens Press*, 47 p., illus., $2.00. Very young potential scientists and also their elders can learn from this beginning reader with its charming illustrations.

THE TRUE BOOK OF PETS—Illa Podendorf—*Childrens Press*, 46 p., illus., $2.00. Telling primary children how to care for their pets and what they can learn from them.

THE UTILIZATION OF SCIENTIFIC AND PROFESSIONAL MANPOWER: Proceedings of a Conference held October 7-11, 1953, at Arden House Harriman Campus of Columbia University—James D. Zellerbach, Chairman—*Columbia University Press*, 197 p., $3.50. In a previous book, the National Manpower Council pointed out that highly trained personnel are not being utilized as effectively as they should be. This book resulted from an attempt to meet this problem. (See p. 2.13.)

VEGETABLES—Jack M. Swartout—*Rinehart*, 92 p., illus., $1.50. To inform and encourage the person with a small plot of ground who wants to grow some fresh food for his table, but doesn't know how.

MEDICINE

Watermelon Sound of Skull Gives New Test

▶ A "WATERMELON sound" from the skull when the examining doctor taps gives a new diagnostic sign of overactive parathyroid glands in the neck, Dr. Frederick A. Fender of Stanford University School of Medicine, San Francisco, reports in the *Journal of the American Medical Association* (Jan. 27).

Dr. Fender discovered the new sign because he is "a creature of habit." He had been asked to make a neurological survey of a woman who had lost the ability to walk, with the object of learning what nerve involvement might be causing her trouble.

Following habit, Dr. Fender reports that he started with percussion, or tapping, of her head. Instead of the "high-pitched crack" that would come from a normal adult skull, he heard a booming, low-pitched note that reminded him of the sound made by tapping on a watermelon.

Later it was found that the patient had overactive parathyroid glands that were causing her trouble. Subsequent tests of other patients showed that the watermelon sound is diagnostic of this gland disturbance.

Science News Letter, April 3, 1954

VITAL STATISTICS

Accidental Poisoning More Likely for Males

▶ MORE MALES than females die of accidental poisoning, statisticians of the Metropolitan Life Insurance Company in New York report.

This is true for every age group, although the death rate from accidental poisoning is highest among children of preschool age and grown-ups in middle life.

Bichloride of mercury and other mercury compounds, arsenic, strychnine and lye have dropped off as accidental poison killers. Barbituric acid and its derivatives, known generally as sleeping pills, now head the list of poisons responsible for accidental deaths in the United States.

Alcohol, mostly wood and denatured alcohol, ranks second.

Science News Letter, April 3, 1954

BIOLOGY

NATURE RAMBLINGS

Porcupine

▶ THE ACHILLES' heel of the porcupine is its soft underbelly. A deft predator that has learned to respect the formidable armament of the porcupine can flip the prickly creature onto its back and quickly kill it.

But the hunter whose training in woodland tactics is deficient on this particular point is in for a lesson it will not soon forget. However big or ferocious it be, whether bear or mountain lion, wolf or fox, lynx or coyote, it makes no difference. To attack a porcupine from the prickly side is at least sharply painful, and at worst deadly fatal. And, the belly excepted, all sides are prickly.

Unmolested, porcupines are docile, harmless creatures. They waddle along the ground or climb slowly in trees preoccupied with the search for bark, mistletoe, and other vegetative delicacies. They are not meat eaters. But if an enemy appears before the safety of den or tree can be reached, the porcupine bristles. The long, strong, sharp quills which cover its body from head to tail, stand out from the body, like pins in a pin-cushion with the pointed ends out.

The porcupine takes a position with its tail to its foe, and as the puzzled would-be attacker circles looking for some place to catch hold of its prey, the porcupine shuffles around to keep its tail pointed to the intruder. If the latter is foolish enough to lunge to the attack, the porcupine delivers a powerful upward blow with its tail, driving quills into the attacker's chin and throat, and at the same time guiding the attacker's mouth and face into the thicket of quills on its back.

The quills are as much as five inches long and barbed. It takes a man with pliers to pull one out. An animal cannot remove them unaided. They work their way in deeper and deeper. Experts disagree on how serious these quill wounds are. Some believe they can lead to death, either from starvation resulting from quills in the mouth, making eating impossible, or else from the eventual penetration of a quill to some vital part. Others think the quills are absorbed eventually by the body tissues, causing pain but no serious harm.

It is popularly thought that porcupines throw their quills like darts in self-defense. Zoologists who have studied the matter think that strictly speaking this is not so. Quills are constantly growing, being lost, and growing in again. The older quills are quite loose. It sometimes happens that a disturbed porcupine will flip up its tail and a loose quill will fly off. The odds against such a flying quill hitting a target, to say nothing of sticking into it, are very slim.

Science News Letter, April 3, 1954

METEOROLOGY

Appoint Head of Unit For Computer Forecasts

▶ THE WEATHER Bureau's new unit to try out weather forecasting by giant "brain" will be headed by Dr. George P. Cressman, now of the Air Force's Air Weather Service at Andrews Air Force Base, Camp Springs, Md.

The group expects to start operating on July 1, although Dr. Cressman does not yet know where the computer, now on order, will be set up. The unit will be the first to test a computer in day-to-day wind predictions and will be operated jointly by the Weather Bureau, Navy and Air Force. (See SNL, Nov. 14, 1953, p. 309.)

Science News Letter, April 3, 1954

BIOCHEMISTRY

Fourth Hemoglobin Type

Discovery of fourth kind of abnormal hemoglobin is reported at American Chemical Society meeting by Dr. Harvey Itano, who wins award for his research on blood compounds.

▶ DISCOVERY OF a fourth kind of abnormal hemoglobin in human red blood cells was announced by Dr. Harvey A. Itano of the California Institute of Technology at the meeting of the American Chemical Society in Kansas City, Mo.

Hemoglobin is the protein that makes red blood cells red. It carries oxygen from the lungs to all parts of the body for use by the tissues.

Dr. Itano and his colleagues previously had traced the disease, sickle-cell anemia, back to a defective hemoglobin molecule and, subsequently, had identified two other abnormal forms of human hemoglobin.

The fourth abnormal hemoglobin was found in the blood of a six-year-old girl suffering from anemia. Her illness had been diagnosed as Cooley's anemia, a rare but well-recognized, classical, childhood blood disease. Though not an oriental, she had the oriental facial characteristics typical of that disease. At the hospital, microscopic studies of her blood cells and X-rays of her bones showed other features characteristic of Cooley's anemia.

But she had never needed a blood transfusion, and this is unusual for that disease. This fact led to laboratory studies by means of electrophoresis, a technique adapted by Dr. Itano for his blood studies. By this method he observes the migration of hemoglobin molecules in an electric field. Different hemoglobins move with different velocities.

The little girl, it turned out, had two kinds of hemoglobin, fetal hemoglobin, which in Cooley's anemia is mixed with normal hemoglobin, and another kind with a mobility different from that of all the other known hemoglobins. This has now been named hemoglobin E.

The other known abnormal hemoglobins —S (sickle cell), C, and D, all of which were identified as abnormal by Dr. Itano— are inherited. Whether this is true also for hemoglobin E is not yet known because circumstances have made it impossible so far to examine the rest of the girl's family.

Associated with Dr. Itano in the recent research were Drs. Phillip Sturgeon and William R. Bergren of the department of research, Children's Hospital, Los Angeles, and the University of Southern California School of Medicine, who also presented papers on their phases of the work.

Dr. Itano was presented with the Eli Lilly and Company Award in Biological Chemistry for his studies on hemoglobin.

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Questions

ANTHROPOLOGY—What kinds of migrations have influenced cultural development in the eastern U. S.? p. 213.

□ □ □

ASTRONOMY — How fast does the eclipse shadow race across the earth's surface? p. 218.

□ □ □

BIOCHEMISTRY—What are purines? p. 214. What causes a drunk's breath to smell? p. 219.

□ □ □

GENERAL SCIENCE—When is the best creative scientific work usually done? p. 214.

□ □ □

METEOROLOGY—What is the advantage of local forecasts covering three days? p. 215.

□ □ □

PHYSICS—What new technique is being used to study cosmic rays? p. 215.

□ □ □

PSYCHIATRY—How are high blood pressure and hostility in dreams related? p. 212.

□ □ □

Photographs: Cover, National Institutes of Health; p. 211, Alburtus, Yale News Bureau; p. 213, General Electric Company; p. 215, Glenn L. Martin Company; p. 218, Sydney Chapman; p. 224, Eastman Chemical Products, Inc.

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 720. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

GOLF BALL has been redesigned to yield greater driving distance through a cover having better "aerodynamic" qualities. Tiny diamonds replace the standard pattern on the cover. The new cover is said to keep the ball in the air almost a quarter of a second longer, adding 10 yards to the golfer's drive. The cover is a brilliant, easy-to-see white.

Science News Letter, April 3, 1954

REMOTE TONGS for handling radioactive substances can be manipulated on arms in lengths of 22, 28 or 46 inches. The device has a pistol grip handle and a squeeze-to-release trigger. Made of heavy aluminum, the arm can be equipped with a "scissor" jaw for handling small and large vessels, or a "monkey wrench" jaw for handling heavy objects.

Science News Letter, April 3, 1954

SHEET FILM for professional press, commercial, portrait and industrial photographers is twice as fast as previous panchromatic films of its type. Its A.S.A. exposure index of 200 for daylight was obtained without any increase in film graininess, and it tolerates a wide range of over- and under-exposure.

Science News Letter, April 3, 1954

FOUNTAIN BRUSH paint set for children uses butyrate plastic "brushes" that actually are water-filled tubes charged with a pellet of concentrated color. The child can paint for hours without spattering water and color. Refill color pellets are included in the set, shown in the photograph, along with large outline pictures for coloring.

Science News Letter, April 3, 1954

TROLLING TACKLE helps the deep-sea sportsman fish at the desired depth. Attached to the line, the acetate plastic device is adjusted to draw the bait down by an easy-to-set weight. The tube-like device has two small fins designed to keep the line from twisting.

Science News Letter, April 3, 1954

MOTORIZED CARD file stores 200,000 to 300,000 standard sized office cards in a compact unit. Pushbutton controls permit the office girl to select the proper tray of cards quickly.

Science News Letter, April 3, 1954

FOOTBATH TRAY for shower rooms, beach houses and swimming pools is made of a tough, long-lived rubber having a waffle-like, anti-slip tread. The tray is 19 inches in diameter and stands 3.5 inches high.

Science News Letter, April 3, 1954

PAINTER'S AID fits inside paint cans to keep paint from dripping down the sides of the can and to make pouring, mixing and straining an easy, neat job. The steel device also has a handy brush holder positioned so the brush will drip into the can.

Science News Letter, April 3, 1954

Do You Know?

A new vanadium *mineral*, a dark brown, fibrous mineral, has been named Navajoite in honor of the Navajo Indians on whose reservation in northeastern Arizona it was found.

Fertilizer use has more than doubled in the past 12 years.

The educational *television* station in Houston, Tex., has developed a technique of giving piano lessons by television.

The United States government owns an estimated one out of five of all the *machine tools* in the country, equivalent to nearly four years' output of the tool industry.

Throughout the world *malaria* is the costliest disease, counting at least 300,000,000 people among its victims.

Nearly 17,000,000 people in 930 U. S. communities are now drinking *water* which has been treated by fluoridation plants.